SEMIANNUAL REPORT ON THE PILOT PROGRAM FOR INSPECTIONS OF ANIMAL WASTE MANAGEMENT SYSTEMS
January 1, 2011 – June 30, 2011

Introduction

In accordance with Section 12.7(b) of S.L. 2005-276, the objective of the Animal Waste Management Inspection Pilot (hereinafter the pilot), is to determine how Division of Soil and Water Conservation (DSWC) staff can respond more quickly and effectively, with technical assistance, to complaints and problems to help farms achieve compliance with environmental regulations. In addition, the program allows staff to test approaches for earlier identification of problems and to target resources for expediting corrective actions.

The pilot program started in 1997 with Columbus and Jones Counties and was expanded in 1999 and in 2005 to include Brunswick and Pender Counties, respectively. The General Assembly, through Session Law 2011-391, extended the pilot program through June 30, 2013.

In non-pilot counties, DWQ performs annual routine compliance inspections of all permitted livestock operations; however, in the pilot counties, DSWC staff conducted *routine* compliance inspections in addition to performing *routine* operation reviews of all permitted livestock operations. Routine operation review reviews were typically completed in the spring and compliance inspections completed in the fall. In the pilot counties, DWQ staff provides regulatory oversight, performs compliance audits with DSWC staff of "targeted" potential high environmental impact farms, responds to DSWC referrals, and conducts additional compliance inspections for further investigation and enforcement actions as warranted.

There are 166 active swine farms in the pilot area of Brunswick, Columbus, Jones, and Pender Counties. When the Environmental Protection Agency (EPA) revised its National Pollutant Discharge Elimination System (NPDES) regulation in response to the 2nd-Circuit Court of Appeals ruling in the *Waterkeeper et al. v. EPA*, the number of pilot farms operating under NPDES permits dropped from 95 to 1 in 2007. Currently, all 166 pilot farms are operating under State Non-discharge general permits.

2011 Session Law Changes

During this reporting period, the Pilot Program was implemented as described above. However, effective July 1, 2011, Session Law 2011-145 removed the requirement for routine operation reviews to be conducted by DSWC on permitted animal operations. Each facility will continue to receive an annual compliance inspection by DWQ or DSWC in the pilot counties. Future operation reviews and technical assistance will remain a service DSWC provides as requested by animal operation owners.

Session Law 2011-145 also transferred the DSWC to the Department of Agriculture and Consumer Services from the Department of Environment and Natural Resources. This transition will not affect the continuance of service or implementation of the pilot program.

Site Visit Data

Activity from January 1 through June 30, 2011, both in and out of the pilot area, is reflected in the following data that was either queried from DWQ's Basinwide Implementation Management Systems (BIMS) database or presented in DWQ's Data Reports:

- Statewide – 2,384 animal operations were subject to permitting and inspection
- Statewide - DENR staff conducted 2,243 site visits (1,153 by DSWC & SWCD and 1,090 by DWQ).
- Pilot area - 166 animal operations were subject to permitting and inspection.
- Pilot area - DENR staff conducted 166 site visits (155 by DSWC and 11 by DWQ).

Precipitation

Annual precipitation amounts and events have the biggest impact on compliance performance by farms in the pilot program area. In addition to the storage and treatment volume for waste and wash water, anaerobic lagoons and waste storage ponds are generally designed to store one 25-year, 24-hour storm event (ranges from 7 to 8 inches in pilot area), and 180 days of normal rainfall . Precipitation amounts that are significantly greater than the historical average and/or periods of prolonged precipitation can strain the storage capacity of the waste system. In addition, the waste system's capacity to apply waste to receiving crops is also diminished due to wet or frozen soil conditions, wind, and/or limited availability of adequate crops to utilize the nutrients in the waste. Conversely, dry conditions can negatively impact vegetative cover on dike walls of waste structures and damage receiving crops.

The pilot area experienced a tremendous spike in precipitation amounts at the end of September 2010. Heavy rainfall initially started due to a slow moving front that approached from the northwest. As the front became stationary, the rainfall continued. The situation was aggravated as moisture from the remnants of Tropical Storm Nicole joined with the frontal system resulting in record rainfall in parts of the pilot area and eastern North Carolina. Of the pilot counties, Jones County was most affected, receiving more than 20 inches of rain during the last week of September.

Figure A reflects the abnormally wet conditions experienced by the pilot area during the late fall of 2010. Variability in precipitation distribution can have an impact on animal farm compliance patterns even if annual precipitation totals are near normal or less.

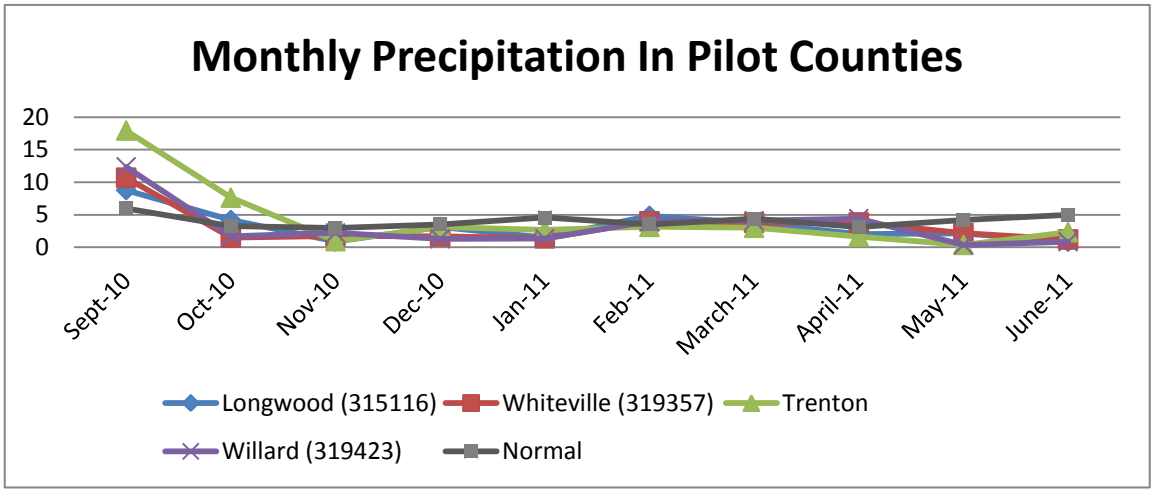

Figure A. September 2010 - June 2011 monthly normal and actual precipitation amounts measured at weather stations located within the four pilot counties. Please note the data from station in Trenton, NC was last observed in December 2010. Data used since January 2011 was from the closest station to Trenton. *Source: North Carolina State Climate Office - CRONOS Database.*

Environmental Impact Groups

DSWC staff continued to use the environmental scale first described in the May 21, 2002 Addendum ERC Report to separate pilot animal operations based on their compliance performance and relative potential for environmental impact. Data is gathered through DENR's standard inspection form and entered into DWQ's Basinwide Implementation Management Systems (BIMS) database. The pilot's operational indicators and problem parameters are then queried and assessed from these documented site visits.

Table 1 lists the operational indicators used to assess animal waste management systems' performance on the pilot farms with assigned points to reflect the degree of "immediate" or "potential" threat a specific compliance deficiency would have on the environment. The program is based on the following 15 indicators with relative point values remaining constant since 2002.

Operational Indicators	Point Value
Offsite discharge	20
Structural integrity compromised	18
Waste in structural freeboard range	16
Hydraulic overloading or ponding	15
Nitrogen over-applied ≥ 10%	12
Waste level in storm storage	11
Irrigation system maintenance deficiency	11
Structural maintenance deficiency	10
Receiving crop inconsistent with waste plan	10
Irrigation records deficient	10
Lagoon level records deficient	9
Nitrogen over-applied <10%	8
Receiving crop/sprayfield needs improvement	8
Waste analysis deficient	8
Soil analysis deficient	7

Table 1. Operational indicators and related point values are used by DENR staff to evaluate farm's potential impact on the environment. Items in italics represent "immediate threat" indicators.

Pilot farms were scored by the noncompliance points received for those operational indicators that were observed. The pilot farms were then ranked by the total points received. The farms were categorized into three potential impact groupings based on their total noncompliance scores.

Point ranges for these groupings, as shown in **Table 2**, were initially determined from farm performance in 2000 and remained unchanged through 2011.

Potential Impact Group	Noncompliance points
Low environmental impact	0 – 12 points per year
Medium environmental impact	13 – 30 points per year
High environmental impact	31 or more points per year

Table 2. Potential environmental impact groupings and corresponding noncompliance point ranges

Farms in the low and medium environmental impact groups are generally deemed to be responsive to technical assistance and subject to continued *routine* operation reviews and compliance inspections by DSWC. Farms scoring in the high impact group are subject to more intensive oversight by DSWC and DWQ staff.

Data from the first six months of the 2011 calendar year indicate an increase in the number of farms categorized in low environmental impact groups compared to recent years. From January 1st to June 30th 2011, the percentage of pilot farms categorized as

low environmental impact increased to 94.6% (see Table 3). Only 3 farms (1.8%) were categorized as high environmental impact.

Environmental Impact Group	Number of pilot farms	Percentage of total pilot farms
Low	157	94.6%
Medium	6	3.6%
High	3	1.8%

Table 3: Summary of Environmental Impact Group Rating for the pilot farms Jan – June 2011.

Table 4 summarizes the frequency of occurrence for the program's operational indicators during the first six months of 2011. The decreased frequency for *waste level in storm storage* indicator compared to the same period one year ago is attributed to the precipitation amounts being below normal during the winter months.

Operational Indicator	2010(%)	2011 (%)
Offsite discharge	*1.20*	*0.6*
Structural integrity compromised	*0.00*	*0.0*
Waste in structural freeboard range	*2.41*	*1.2*
Hydraulic overloading or ponding	*3.01*	*1.2*
Nitrogen over-applied ≥ 10%	*0.60*	*0.6*
Waste level in storm storage	33.73	1.8
Irrigation system maintenance deficiency	0.00	0.0
Structural maintenance deficiency	1.81	1.8
Receiving crop inconsistent with waste plan	1.20	0
Irrigation records deficient	3.01	3.6
Waste level records deficient	3.61	1.2
Nitrogen over-applied < 10%	0.60	0
Receiving crop/sprayfield needs improvement	11.45	8.4
Waste analysis deficient	1.81	0.6
Soil analysis deficient	3.01	1.8

Table 4: Frequency of Occurrence displayed as a percentage for finding an operational indicator on a pilot farm form January 1, 2010 through June 20, 2011. Items in italics represent "immediate threat" indicators.

Cost & Labor Comparisons

Salaries, office rent, administrative and operating costs, coded work hours, and actual mileage costs were compiled to determine the pilot program total operating cost of $30,985; approximately $199 per site visit conducted during the reporting period. The total DSWC costs associated with completing operation reviews on for non-pilot farms was $133,254; approximately $134 per site visit. These costs do not represent expenses incurred by local soil and water conservation districts which completed the operation reviews in their respective county.

Table 5 reflects key cost and labor comparisons. The DSWC's per-visit costs for the non-pilot site visits are substantially lower than previous years. A contributing factor is the decreased number of routine operation review inspections for non-pilot farms. Historically, the number of operation reviews completed by June 30 would have been approximately 20% more. However, several factors influenced the decrease in reviews completed such as the Division's need to more closely monitor mileage overages for motor fleet vehicles as well as two vacancies during the entire reporting period.

DSWC is predicting that the total cost associated with the Pilot Program will continue to decrease due to Session Law 2011-145 requiring only one routine compliance inspection for each operation. Future reports will likely show a substantial difference in cost comparisons of pilot and non-pilot farms resulting from Session Law 2011-145 removing the mandatory requirement of an operation review on all permitted farms.

	Pilot Farms	Non-pilot Farms
Salary and Benefits	$29,948	$102,146
Operating Expenses (office rent and mileage)	$6,946	$31,108
Total Expenses	**$30,895**	**$133,254**
Total DSWC Site Visits	155 site visits	998 site visits
Hours per Site Visit	5.93 hours per site visit	4.02 hours per site visit
Cost per Site Visit	$199 per DSWC visit	$134 per DSWC visit

Table 5. Cost and Labor Comparisons for DSWC Operations Review Staff between January and June 2011.

Conclusions

From 1999 through June 30, 2011, the Pilot Program has collected data from 4,185 documented site visits to permitted animal operations in Brunswick, Columbus, Jones, and Pender Counties. DSWC staff continues to use the data to study and better understand the factors that influence compliance and affect the potential for environmental impact by conventional animal waste management systems. During the period covered in this report, DSWC experienced or observed the following:

- In the first two quarters of calendar year 2011, 98% of farms in the pilot counties were identified as having a medium or low potential impact based on operation indicators.

- The record rainfall that occurred during the late Fall 2010 did not result in long term incidents of non-compliance related to high waste liquid levels. The occurrence of high waste liquid levels decreased by 95% and the occurrence of deficient receiving crops in spray fields decreased by 27%.

- The impact of the statewide operation review program on producers, both in and out of the pilot area, indicate DSWC site visits are meeting the overall program objective of providing technical assistance.

- In accordance with current legislation, the Pilot Program is scheduled to terminate on June 30, 2013.